FOREST SERVICE - U. S. DEPARTMENT OF AGRICULTURE

PACIFIC SOUTHWEST
FOREST AND RANGE
EXPERIMENT STATION
BERKELEY - CALIFORNIA

RESEARCH NOTE

No. 153

July 1959

TEN-YEAR OBSERVATIONS ON PRUNED PONDEROSA AND JEFFREY PINE

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In 1956 Hallin[1/] reported some observed effects of pruning ponderosa and Jeffrey pine based on the response after 5 years. This report is an extension of those observations, after a 10-year reexamination of the experiment.

Hallin suggested that half the live crown, or six-tenths of total height of the tree could be pruned without adverse effects on growth. Pruning out three-fourths of the live crown resulted in death of 52 percent of such treated trees at the end of 5 years. Also of considerable interest was the rapid growth rate found for open-grown trees on the poor site where the study was installed. Practical guides to pruning heights were also given. In general, the 10-year data substantiate Hallin's conclusions.

The Study

The study was started in 1947 at Blacks Mountain Experimental Forest, in the eastside pine type. Twenty-five groups of four ponderosa or Jeffrey pine crop trees were selected in an open-grown stand from which all overstory had been removed.

Treatments consisted of: no pruning (Po) and removal of one-fourth (P.25), one-half (P.50), and three-fourths (P.75) of the live crowns. Treatments were assigned at random to the four crop trees in each group. The diameters of the trees were recorded when the study was started, and 2 years, 5 years, and 10 years later. The 100 trees selected for the experiment ranged from 2.8 to 8.8 inches in diameter, and averaged 5.4 inches. Total height, and distance from ground to base of live crown,

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1/ Hallin, William E. Pruning ponderosa and Jeffrey pine. U.S. Forest Service, Calif. Forest and Range Expt. Sta. Res. Note 115, 4 pp. 1956

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were also measured before treatment. The average site index at Blacks Mountain is 72. 2/

Growth Trends

Ten-year diameter growth trends showed a slight divergence of curves for no pruning and 50 percent pruning (fig. 1), but the difference in growth rates for these two treatments was found to be non-significant by t-test (0.05 level). A "shock effect" on growth rate of trees pruned 50 and 75 percent is indicated during the first 2-year period. By the end of the first 5-year period, however, recovery of trees pruned 50 percent was apparently complete, and their growth almost paralleled that for unpruned trees.

Growth Rates

At the end of 10 years there was no significant difference in diameter growth rate between unpruned trees and those with half the live crown removed (table 1). Presumably, then, we can lump growth of all trees having half or less of live crown removed. This would give an overall average diameter growth of 2.87 inches in 10 years for unpruned trees and for trees with pruning treatments that could be recommended.

Table 1.--Ten-year diameter growth, by pruning treatment

Fraction of length of live crown removed	Ten years growth in d.b.h.	Basis, trees
	Inches	Number
None	3.00	25
1/4	3.09	25
1/2	2.50	25
3/4 1/	1.38	12

1/ Only trees alive at the end of 10 years included.

This rate of growth suggests that under certain conditions of intensive management some low-site areas having pruned trees could be

2/ Meyer, Walter H., Yield of even-aged stands of ponderosa pine. U.S. Dept. Agr. Tech. Bul. 630. 59 pp., illus. 1938.

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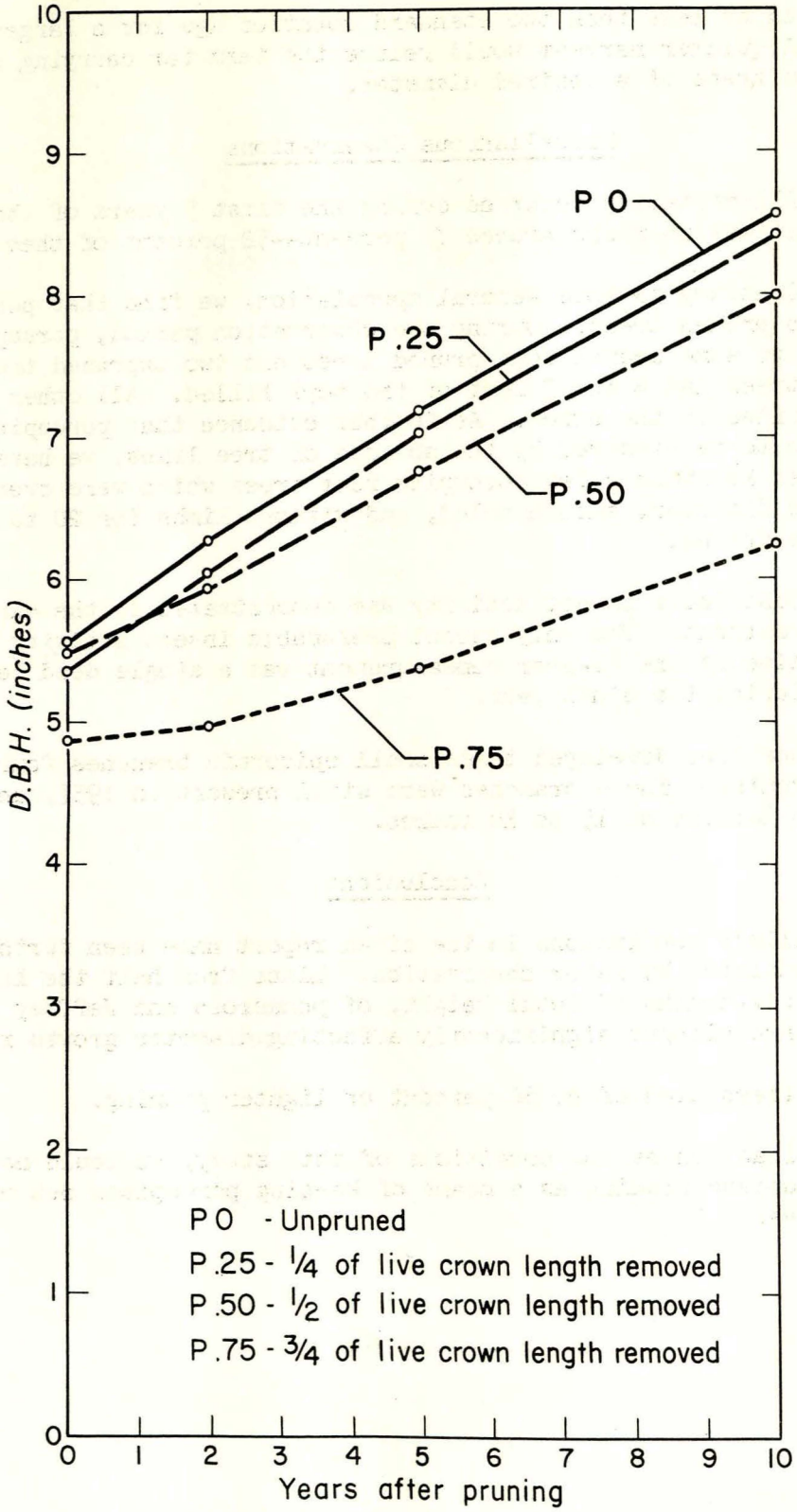

Figure 1.--Growth trends

harvested at less than the standard rotation age for a larger general area. A quicker harvest would reduce the term for carrying pruning costs on trees of a desired diameter.

Miscellaneous Observations

All mortality occurred during the first 5 years of the study. All of it was in trees pruned 75 percent--52 percent of them died.

Contrary to some general speculation, we find that porcupines do climb pruned trees. During the observation period, porcupines damaged to some degree four pruned trees and two unpruned trees. Two of the trees had 4 and 9 feet of the tops killed. All other damage was confined to the boles. As further evidence that porcupines do not seem to be hindered by the absence of tree limbs, we have observed at Blacks Mountain a few porcupine rest trees which were overmature, of large diameter, smooth boled, and without limbs for 20 to 30 feet from the ground.

Observable insect activity was concentrated in the early years after treatment. The only recent presumable insect activity observed at the time of the 10-year remeasurement was a single dead leader, killed during the ninth year.

One tree developed three small epicormic branches four years after pruning. These branches were still present in 1957, and had grown to lengths of 15 to 18 inches.

Conclusions

(1) Hallin's conclusions in the cited report have been further substantiated by later observation. Limbs from half the live crown, or six-tenths of total height, of ponderosa and Jeffrey pine were pruned without significantly affecting diameter growth rate.

(2) No trees died after 50 percent or lighter pruning.

(3) At least under the conditions of this study, we could not recommend pruning as a means of keeping porcupines out of the trees.